

BEETLE ECOLOGY (2)

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Before briefly discussing a suggested plan of action for coleopterological work on ecological lines the serious student may find some value in considering a comprehensive plan upon which to base the whole of his work.

In making ordered, or scientific investigations, into any of the problems concerned with Nature, experience teaches us that the more complete the data we have to work upon, the more valuable can be the conclusions based thereon. It follows therefore, that in pursuance of our search for a more complete knowledge of the Beetles we should be unwise to disregard any of the existing information relevant to our special subject. In adopting the ecological approach we should be wrong not to combine and use with it all the information available to us from the vast amount of previous work which has been done and which is recorded in the literature built up on what we will call more orthodox lines. The essential principle of ecology, that of combining all the knowledge, is thus brought into use from the very beginning of our studies and by consciously keeping it in front of us, like the carrot before the nose of the donkey, we are more likely to do successful work, or even to make new discoveries concerning the laws of nature, than in any other way.

The beetle ecologist will therefore make a study of what we believe to be the fundamentals of the natural sciences. This is a huge undertaking, and without the possession of a certain background, or flair for the assimilation of the kind of knowledge which will be required for his special work, the task will be a heavy one. To those naturalists who are in possession of the bent for this kind of research, the way will not be so hard. A practical suggestion is to set oneself a course for reading up the appropriate literature. In fact the continual reading of the right kind of material will become second nature to the student who is really interested in his work, and his sense of discrimination will sharpen as his experience widens.

A standard introduction to Geology is an early requirement, for the coleopterist should provide himself with as much information as possible upon the evolution of his chosen group of organisms. Not only will he want to know the geological horizon in which his group first appeared but knowledge of the position of this group and its relation in geological time to other related groups of organisms will be found of value. A general work on Zoology must be included which will give an overall view of the zoological kingdom and the broad interrelationships of the diverse organisms which make up the whole. Biological study should be based upon a sound standard work on Animal Biology, supplemented by a many books and papers upon the life-histories of different

kinds of animals (*sensu lat.*) as possible. In regard to insect life-histories, much valuable information can be obtained from the economic, or pest literature, which leads to the beetle ecologists' further requirement - the study of food plants and other beetle hosts. He will find that but a partial knowledge of the local flora will be of great advantage even though this is limited to a recognition of the Natural Orders of the plants. A good local 'flora' will assist him in this respect.

The ecologist must not disregard the general subject of the origins of the different forms of life and it follows therefore that the Darwinian conception of evolution, the origin of specific forms, Mendel's theory of hereditary characteristics and de Vries' exposition of the origin of species by mutation should be covered. The earlier works in this connection such as that of Lamarch ought not to be omitted.

Keeping to our plan of gathering a broad background of knowledge upon which to base our own ideas in connection with our chosen group, we come to a consideration of the information required upon the Insecta as a whole. For this purpose we want a standard textbook of Entomology which covers the Morphology, Biology and Systematics of the subject as well as providing good bibliographies to each order of insects. The extent of each insect order and the differing ways of life of their representative species are factors of significance to the coleopterist who will find that many of the beetles are associated with other insects in various ways during their life stages. For example the beetle egg, larva, pupa or imago may comprise the food of some other insect, or be the host for insect and other parasites.

It is then necessary to study the systematics of the Insecta to ascertain, as far as possible, the present classification, and preliminary details for this purpose will be found in the textbook of entomology above mentioned. This will give some idea of the basis upon which the modern classification of the order Coleoptera stands. It is at this stage will be found of particular value a knowledge of the outstanding theories of species origins and evolutionary development culled from the above mentioned, and other standard works upon evolution, for a classification of our particular group can only be a sound one if it truly pictures the way in which its component species have evolved and are now evolving, and in addition, shows clearly the relationships between its own and allied insect orders. Incidentally it will become more and more plain to the ecologist that the present basis of the classification of the beetles is extremely rudimentary and that there is a crying need for a great amount of bionomic and taxonomic data which he can provide for himself and specialists to work upon.

(to be continued)

COLLECTOR OF TROPICAL INSECTS

Prof. C. P. Alexander informs the editor that "the well-known tropical collector, William Clark MacIntyre, Cojimies, Manabi, ECUADOR is resuming collecting and would be interested to hear from prospective buyers." MacIntyre and his native assistants are known to be among the most efficient collectors of tropical insects.

R.H.A.